

J. Duoley—

ANNUAL
REPORT
OF THE
CANAL COMMISSIONERS
OF THE
STATE OF NEW-YORK,
PRESENTED TO
THE LEGISLATURE,
12th MARCH, 1821.



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To the Legislature of the State of New-York, pursuant to the act, entitled, "An act respecting navigable communications, between the great Western and Northern Lakes, and the Atlantic Ocean," passed April 15th, 1817, the Canal Commissioners most respectfully

REPORT ;—

THAT the construction of the great works submitted to their superintendence, has advanced, during the past season, with greater economy than any antecedent experience had led them to expect. The want of money, in the country, and the growing reputation of the undertakings, have greatly encreased the number of responsible competitors for contracts; of which the natural effect has been, a reduction, in the price of almost every kind of labor required, on the canals: And this effect has been further promoted, by the abundant stores of grain and provisions, in the interior of the state, for which there has been no foreign demand.

While the labor of opening, both the Eastern and Western sections of the Erie canal, has been prosecuted, with undiminished energy, and, under contracts reduced, from thirty to forty per cent., below former prices, the Canal Commissioners, since their last report, have had new and more minute surveys extended through nearly all the country, between the Genesee river and Lake Erie, and between Utica and the Hudson, with a view to the most eligible establishment of the canal-route. The surveys, made in the year 1816, by Engineers Geddes and Peacock, furnished us with a full conviction of

the practicability of effecting a navigable communication, between Lake Erie and the Genesee river, and enabled us to form a probable estimate of the expense. But those surveys indicated two passages, through either of which the canal might be carried, leaving it to be determined, by subsequent more particular examinations, which of the two should be preferred.

The most southerly of these passages, had the advantage, of a location more through the centre of our western settlements,—of being several miles shorter,—and of requiring less expenditure, in the construction of the canal, than the other, according to our estimates, of upwards of \$300,000. But pursuing that passage the canal must be raised about seventy-five feet above the surface of Lake Erie, which would, of course, deprive us of feeding it, with water, from that inexhaustible source. And a fear was entertained, from the beginning, of an ultimate deficiency of water, in that passage, if it should be adopted. For the purpose of ascertaining, whether such a fear were groundless or not, we have had the various springs and streams, which might be conducted into the summit level of the canal, on that route, gauged; and have considered the surface and character of the country, from which the rains would naturally drain into that level. And the result has been a unanimous conviction, in our minds, that the fear is but too well grounded.

The estimates of water to be obtained, in the present condition of the country, for that summit level, if it could be all saved, does not appear de-

ficient; and these estimates were made, upon the state of the waters, in a period of drought. But, since the Middle Section of the canal has been filled, we have found, that more water has been wasted, in it, by evaporation, soakage, and leakage, than we had anticipated. And this discovery we deem, in itself, sufficient to settle the question, between the two routes. But there are other considerations, by no means to be overlooked, in relation to this question.

The country from which water may be had, for the southern route, rises as it stretches south of the canal, but very gently, and the distance is not far, before it has a greater declivity, in other directions, than towards the canal; and much of it is yet uncleared. Now all experience shows, that it would be unsafe to calculate, that the springs and streams of a new country, will not grow more penurious of their waters, in proportion as the forests are felled and removed, and the earth is subjected to cultivation.

The vegetable matter, which constitutes the soil, of all lands thickly covered with wood in their natural state, operates, like a sponge, to retain the waters, with which it may be filled; and the surplus waters, which may fall upon such lands, collect, in the natural basins upon their surface, serving as reservoirs for the numerous springs, which break out below; or they slowly pass off, in streams obstructed by trunks of trees, and other ruins of the forest. But when the hand of vigorous and judicious agriculture is once introduced, the aspect of

such lands, is very soon altered. The quantity of water retained upon the surface is diminished,—by letting in the sun upon the soil,—by draining the swamps,—and by removing the obstructions from the streams.

With the progress of cultivation many springs wholly disappear, others are essentially lessened, and the larger streams become little brooks; except during the actual continuance of a great thaw or a heavy rain. Whenever these occur, the floods are rendered greater, by cultivation, than they were before; because much less water is absorbed, by the surface of cleared fields than of wood lands in their natural state; and, because all the water not absorbed, finds a much less impeded passage, into the channels of the streams. But if the waters rise, suddenly, on such occasions, in the streams of a cultivated country, they as soon subside. And many a farm in our state, which to the new settler, when he first took possession of it, appeared objectionable, for being too wet for his purposes, an experience of twenty years has shown to be much more objectionable for being too dry.

Impressed with these considerations, we have concluded that prudence would not permit us to adopt any route west of the Genesee river, which should rise above the level of Lake Erie. The most northerly route indicated, on the engraved map of 1817, does not rise above that level. To that route, therefore, during the last year, our attention has been specially directed. And we have constantly employed David Thomas, as Engineer,

with all the necessary assistants, upon it, from May till late in November. The results of the examination made by this party, have been much to our gratification, for they have confirmed our former most favourable impressions, after having been produced with great care, diligence, and skill.

The survey of Mr. Thomas has been extended, from Genesee river to the Tonnewanta creek, a distance of a little more than seventy-two miles, including the deep cutting, through the Mountain ridge. And throughout this survey, the face of the country,—the nature of the earth to be excavated,—and the character of the streams to be passed, are all so well understood, that the canal-line may be speedily prepared for the contractor.

From the Genesee river easterly, there are fifty-one miles and a quarter, of the canal line, either completed, or under contract, including the whole distance from that river to Montezuma, except about nine miles. These nine miles have not heretofore been placed in a condition to be opened, because the appropriations would not warrant entering into engagements with contractors for the whole distance between Rochester and Montezuma, and because there is now, contiguous to these nine miles nearest the latter place, and extending from near one end of them to the other, a circuitous and imperfect navigation by means of the Canandaigua outlet and the Seneca river. With the ample appropriations made at the present session of the Legislature, it will be the duty of the Canal Commissioners to complete the canal through these nine miles, with all possible despatch.

In the fifty-one miles and a quarter, of the canal line above mentioned, there have been two important deviations from the route, which was traced in 1816, both of which are deemed improvements. One of them is in the place of crossing the valley of the Irondequot creek. Here it was found, that instead of establishing the line, so as to require an embankment twenty chains long, on the top, and sixty-five feet, in height, from the bottom of the valley, it might be so located, by carrying it a little further north, as to divide this great embankment, into two parts, both of which, would not contain more cubic yards, than the one required, on the first route. And, as the earth in this vicinity consists too exclusively of sand and gravel to be well adapted to embankments, this division was thought judicious, and the new line was adopted. But since its adoption, instead of the largest of the two embankments, we have concluded to substitute an aqueduct of wood. It was found, by calculation, that the construction of this embankment would involve the expenditure of a capital so large, that the interest of it would exceed the sum required to complete the aqueduct together with the interest thereon, computing the interest, in both cases, for the probable duration of the aqueduct. Economy, therefore, induced us to make the substitute. We had, however, a strong additional inducement to the course, which we adopted; and this was, the safety of the work after its completion. It has already been mentioned that the quality of the earth near the embankment is not fit for use, in

it. When, by means of the aqueduct, the canal is rendered navigable, good earth for the embankment, may be economically brought from a distance, in boats; and the embankment may be constructed of such materials as will be safe, and at the same time raised and completed in such a way as to cause no interruption in the use of the canal, by the removal of the aqueduct.

The other alteration consists, in carrying the canal line south of Mud creek, from a point a little west of Palmyra village, to a point a little west of the village of Lyons, the distance, between these two points being about fourteen miles. The line, as explored in 1816, was all the way on the north side of this creek. But the new route is recommended, by its shortening the length of the canal two miles and fifty-two chains, by its being less expensive, and by its passing through earth more suitable for ensuring the canal against injurious accidents, when it shall be filled with water. This new route was examined, and found eligible, by Nathan S. Roberts, Esquire, one of our Resident Engineers, whose vigilance and industry deserves much praise; though in justice to the sagacity of Judge Geddes, the Engineer who explored the western section of the Erie canal, with so much perseverance and good judgment, in 1816, it ought not to be forgotten, that he suggested the propriety of surveying this new route.

The contracts west of the Middle section, besides grubbing and clearing, excavation, embank-

ment and fencing, provide for the construction of the following more artificial works, to wit:—

Fifteen locks of various lifts, but which, in the aggregate furnish the means of ascending or descending, one hundred and eighteen feet. One of these locks is nearly completed in the handsomest and most substantial manner; and the materials for all the others are now chiefly procured and delivered:—

Twenty stone culverts, of different sizes, all to be arched and placed upon permanent foundations, and more than half of which are now finished with great solidity and beauty:—

Five aqueducts, of which *one* is to cross Mud creek, near Lyons, and to be constructed entirely of stone, with three arches of thirty feet span each, one is to cross the same creek near Palmyra, and to be constructed of stone abutments and piers, with a wooden trunk resting upon them; *two* are to cross the valley of Irondequot creek, and a narrow ridge adjacent thereto, these two being to be built exclusively of wood, and to extend, in the aggregate, a length of 1350 feet;—and *one* is to cross Black brook, in the town of Galen, and to consist of stone abutments supporting a wooden trunk. The foundations of these aqueducts are in considerable forwardness, and most of the materials, for their completion, are delivered:—

Forty Road-bridges and a smaller number of Occupation-bridges. About half of these bridges are erected, and all of them which have been con-

tracted for, during the last season, are required to be six inches higher above the top water line, and to be made eight feet wider, between their abutments, than those were, which had been previously built, on the Middle section.

All the above contracts have been prosecuted with great zeal and success, insomuch that in the aggregate the fifty-one miles and a quarter, are more than half done; and nine miles have been in such condition, as to allow of an experimental admission of water. A large part of this extent runs through the sands of Perrinton and Pittsford, where we have always had a great apprehension of difficulty, by leaks and breaches. Through these sands we had taken the precaution to have the banks made much thicker than usual, and with a greater slope; and the effects of admitting the water, to the depth of about two feet, have been satisfactory and encouraging.

Having adopted that route, for the canal, which, at every departure from the level of Lake Erie, in its progress eastward, will descend, till it reaches the Seneca river, we entertain no doubt of an abundant and permanent supply of water, for every part of the canal line. But, in order to provide against any possibility of danger, on this subject, it is intended to construct the canal, through the dry region, between the locks, at the Mountain ridge, and the Genesee river, with a descent towards the east, of one or two inches, in every mile; the necessary effect of which will be, to save the expense of at least one lock, and to induce a current, of so much wa-

ter from Lake Erie, towards the east, as will leave but little to be required from the Genesee river: and this little may be still reduced, if it shall ever become expedient, by a feeder from the Irondequot creek, a copious and equable stream, which it was formerly supposed could not be drawn upon, for the canal, but which, by the enterprising zeal of David S. Bates, Esquire, one of our Resident Engineers, has been found capable of being taken into it, at Pittsford, near the west end of a level, about thirteen miles in length. From this level eastward, there might be obtained a sufficient supply of water, from the Canandaigua Lake, Mud creek, and several other sources, for all the demands of the canal, if the Genesee river were annihilated.

On the middle section of the canal, we have placed mile-boards, duly painted and numbered, from one end to the other. And the whole length of it, as measured from Genesee-street, in the village of Utica, to the lock, which connects it with Seneca river, without including the Salina side cut, is found to be a few chains more than ninety-six miles.

The navigation of this section commenced throughout in May last. But, as there were several places on it requiring repairs; and as it was soon discovered, that our supply of water, would not be adequate to the requirement of an extensive and increasing transportation, some time was occupied in repairing breaches, in strengthening weak places, especially those, where the high embankments had settled, and in opening several new feeders. And

we did not think we should be justified, in asking toll, till the first of July. From that time, till the ice prevented all passing, there has been received, for toll, on this section, the sum of \$5244 34.

This amount has been collected, by charging at the following rates, which were agreed upon at a meeting of the Canal Commissioners, and duly advertised, to wit:

- On Salt, 5 mills, per ton, per mile, (7 bbls. of 5 bushels each, or 40 bushels in bulk, being a ton.)
- “ Gypsum, 5 mills, per ton, per mile.
- “ Flour, meal, and all kinds of grain, salted provision, pot and pearl ashes, one cent, per ton, per mile.
- “ Merchandize, two cents, per ton, per mile.
- “ Timber, squared and round, 5 mills, per hundred solid feet, per mile.
- “ Boards, plank and scantling reduced to inch measure, and all siding, lath and other sawed stuff, less than one inch thick, 5 mills, per thousand feet, per mile.
- “ Shingles, one mill, per thousand, per mile.
- “ Brick, sand, lime, iron-ore and stone, 5 mills, per ton, per mile.
- “ Rails and posts for fencing, two cents per thousand, per mile.
- “ Wood for fuel, one cent, per cord, per mile.
- “ All fuel to be used, in the manufacture of salt, to pass free.
- “ Boats made and used chiefly for the transportation of property, on each ton of their capacity, one mill, per mile.

On boats made and used chiefly for the carriage of persons, 5 cents per mile, of their passage.

“ Staves and heading, for pipes, one cent per thousand, per mile.

“ Staves and heading, for hogsheads, 7 mills per thousand, per mile.

“ Staves and heading, for barrels or less, 5 mills, per thousand, per mile.

All articles not enumerated, one cent, per ton, per mile.

Besides the above mentioned amount of toll received, there has been collected, at the Little falls of the Mohawk, since the rights of the Western Inland Lock Navigation Company, have been transferred to the state, the sum of \$450 56, for toll, the toll having been charged, from Rome to the lower lock at the Little falls, at the same rates, per mile, as are stated, in the above table, in reference to the canal line.

To demand and receive these tolls, we have appointed six collectors, and located them, and paid them, as follows, to wit,

Stalham Williams, at Utica,	with a salary of	\$200
Bela B. Hyde,	“ Rome,	“ 200
Samuel Holladay,	“ Canestota,	“ 150
Joshua Forman,	“ Syracuse,	“ 250
Roderick Matson,	“ Bucksville,	“ 200
Sanders Lansing,	“ Little falls,	“ 62 50

The system, adopted by us, for regulating the collection of tolls, requires, that, whenever any property, chargeable with toll, arrives at one of the places of collection, the person entrusted there-

with, should exhibit a bill of particulars, containing an exact account, of all the property, arranged, under different heads, according to the different rates of toll, which it may be liable to pay; and containing also, the name of the boat and its tonnage, if the articles are conveyed in a boat, together with the place, from which it comes, and that, to which, it is destined. When such a bill is presented, it is made the duty of the collector to examine the property, and ascertain, whether it corresponds with the bill. If it does, he receives the full amount of toll arising from the whole passage, and receipts it on the bill, which he copies into a book provided by him for that purpose; after which, the bill, with the receipt, is handed back to the boatman, who, when he arrives at the next place of collection, exhibits his receipted bill, to the collector, and if there has been no change in the lading, is permitted to continue his passage. If additional articles are taken into the canal, between the first collector, to whom the bill of lading is presented, and any subsequent one, such subsequent collector ascertains, whether all such articles are properly added to the bill, and makes the same receipt of toll and entry of those articles, as was made by the first collector, in relation to the original bill. The collectors are required to give bonds for the faithful discharge of their duty. And by way of a check upon their accounts, one of them is required to make an entry of all the property paying toll, at the several places of collection, and of all the receipts therefor, by the col-

lectors. The system further proposes, that, once in three months, an agent of the Canal Commissioners, who is competent to the task, shall examine the books of the several collectors, for the purpose of ascertaining their accuracy; receive from them the amount of tolls, collected during the preceding quarter, and transmit it to the Commissioners of the Canal Fund.

In the course of the last year, there have been paid, on the Middle section of the canal, the following sums, to wit,

For fencing, - - - - -	\$5637 06
On settlement of other old contracts and accounts, - - - - -	3640 64
For erection of houses for collectors and lock-tenders, - - - - -	1407 45
For bridges, - - - - -	130 00
For damages, - - - - -	135 02
For the construction of feeders, - - -	2200 02
For repairs of canal and superintendents' wages, - - - - -	16718 64½

In all, - - - - - \$29868 81½

The expense of reparation has, thus far, been much greater than it probably will be for the same length of time to come. With our utmost exertions, in 1819, we were not able to have a number of contracts, on the Middle section, brought to an end, until the occurrence of frost and snow, in the fall. And there is no earth so impervious to water, but that, if it is subjected to the pressure of a considerable head, immediately after it has been thrown

up, it will be thereby endangered: and, if new embankments are frozen, as soon as they are made, whenever the binding power of the frost is destroyed, the same danger continues. We were well aware, when the contracts were entered into, that all banks, which are intended to hold water, should have time to settle and dry, before they are used for that purpose. And it was accordingly provided that all our contracts should be fully performed, in time to experience these effects, in a good degree. But they were not: and we have been called upon to make the most expensive repairs, in those banks, which were latest raised. The banks have now had time to settle and dry, the breaches have been faithfully closed, great care has been taken to strengthen every place, in which there was any appearance of weakness, and the whole have been so much compacted by travelling upon them, that they are certainly much more solid and secure.

Before toll began to be received, on the canal, the transportation, of the season, had been nearly half accomplished. And the quantity afterwards passing, on the canal, was materially less than it would otherwise have been, in consequence,—of the early want of water in the Mohawk,—of the number of teamsters still soliciting business on the roads, who rather than suddenly change their employment were compelled to transport, at very low rates,—and, of the numerous impediments, which it was known would, at first, hinder that general resort to the canal, which its superior safety, facil-

ity and economy, will speedily and certainly effect. The amount of tolls, however, encreased regularly, during every successive month, in which they were collected. And the best expectations entertained, before hand, of the advantages of transportation, on the canal, have been surpassed. In the course of the next season, while the expenditure, on the Middle section, is likely to be small, the toll collected, will doubtless be many fold greater than it has been, in the course of the past.

During the last year, the construction of the Eastern section of the Erie canal has been commenced: And thirty miles of the line, beginning at the termination of the Middle section, at Utica, and extending, along the valley of the Mohawk, eastwardly of the Little falls, to the town of Minden, is now in such a state of forwardness as to ensure its entire completion, the present year.

The original surveys, on this section, which were extended eastwardly as far as the Schoharie creek, having pointed out a practicable route, for the canal, without marking the precise line, which was to be followed, the Engineers, on the opening of the last season, were required to resurvey the route, and definitively to locate the line; and, at the same time, to lay it off into half mile sections, that it might be put into the hands of the laborers as early as possible. The line embraced many places of difficulty, and admitting of many variations, in its course, much time was necessarily spent, in ascertaining and determining on the best possible location of it; and nearly half of the season had elapsed.

ed, before the most considerable part of the work, could be put under contract. The contractors however commenced their work, with alacrity, and continued to push it, with great vigor, until the approach of winter, when the entire expenditure of the money appropriated to the construction of this section, as well as the inclemency of the season, necessarily suspended their labors.

During the time which has been allowed for active operations, some of the most considerable and arduous undertakings, on the line, have been performed: and every part of the work, which it was important to have done, the last season, has been accomplished. Eight miles connected with the Rome level, is so far complete as to require nothing more to render it navigable than the filling up of the drains, which were left open, for the security of the newly formed banks, which, without this precaution, would have been liable to injury, from the sudden admission of heavy floods of water into the canal. On the remaining twenty-two miles, all the grubbing and clearing is completed, and a considerable proportion of the excavation and embankment.

An important work has been executed, at the dug way, opposite the village of Herkimer, where a steep and sliding hill, on one side, and the Mohawk river, on the other, has barely allowed room, for a road to be formed, between them. At this place, to preserve the road, and to avoid the falling earth, from the hill, it was necessary to construct the canal along the edge of the river, by car-

rying, in the Mohawk a broad and high embankment of earth taken from the hill. This has been done; and the whole has been supported and protected, from the injurious effect of a strong current, by a substantial wall of stone, laid up, from the bottom of the river, to the top of the embankment.

At the Little falls, the spirited exertions of the contractors have been attended with great success; and on two sections, which included what has been considered the most difficult part of the work, and as requiring the labor of years to perform, the whole excavation is already nearly completed; and from the massy fragments of rock, which have been blown from the line of the canal, a broad and substantial wall has been built, which, forming and supporting one side of the canal, extends along the margin of the river, for nearly three quarters of a mile, and rises, to a line measuring from ten to twenty-five feet, above its base. Besides these two sections, there are three sections above, and one below, the falls, on which a good deal of rock has been encountered. A part of it has been thrown out, and what remains to be done can be executed before the termination of the ensuing summer.

From Utica to Minden, there is a fall, in the canal line, of one hundred and five feet, which will be descended, by thirteen locks. For these, contracts have been entered into, for their completion, early in September next. And nearly all the stone necessary for their construction, consisting of the finest and largest blocks of lime stone, have been quarried, hewed and transported to the line of the

canal, and are in readiness to be laid into the works, on the opening of spring.

Of six aqueducts, and thirty-six culverts, which are required, on the line now under contract, the greatest part of them have been built, with stone laid in water-cement, and are completed, in the most substantial and durable manner.

Contracts for the performance of every work, have been obtained, on terms extremely favorable to the state. And it is a most interesting fact, that notwithstanding this part of the canal includes the expensive work, at the Little falls, the most formidable obstacle on the Eastern section, and also includes more than one half of the lockage, between Utica and Schenectady, the whole will be completed, at an expense, per mile, but little exceeding that of the Middle section.

From Minden, the survey, of the route of the canal, was continued along the south side of the Mohawk, to the head of the Cohoes falls. At this point, the Engineer found the first and only practicable place of leaving the valley of the Mohawk, and of descending, with the canal line, to the Hudson. The lateness of the season, and the necessity of his returning to put the line, west of Schenectady, in a situation to be put under contract, before the setting in of winter, prevented his prosecuting his surveys and examinations as far, as under other circumstances, would have been adviseable. But this examination has been such, as to warrant the conclusion, that the canal can be constructed, along this route, at an expense, much within the original estimates.

The important services pertaining to the Engineers department on the Eastern section, have been, for the last season, chiefly devolved upon Canvass White, Esquire, whose usefulness, from the beginning, has been constantly encreasing with the progress of our labors, by his continued assiduity and encreasing knowledge.

The Erie canal now affords an artificial navigation about ninety-eight miles, in length, including the Salina side-cut. And we confidently expect to double that distance, before our next annual report. With the wise and liberal appropriations, which your honorable body has lately made applicable to this undertaking, it is not unreasonable to anticipate, the full consummation, of the project, for connecting the great Lakes of the west, with the Atlantic ocean, before the close of the year 1823.

The works on the Champlain canal have been vigorously prosecuted during the past season. About seventeen miles of excavation, extending from Saratoga falls to within ten miles of the village of Waterford, have been nearly completed. The banks of the canal, on the above seventeen miles, have been formed and completed with a strength and beauty far surpassing any of the similar works which had been previously finished; and it is but justice to attribute this improvement in the permanency and symmetry of the work, to the skill, fidelity and industry of William Jerome, Esq. the Assistant Engineer, to whose superintendence the above mentioned excavation was principally committed. The aqueduct across Fish creek is under contract.

and the materials for its construction are nearly all delivered. Contracts have also been made for the waste weirs, bridges, &c. and for fencing the canal, which are in part executed. A dam has been thrown across the Hudson, at the head of Fort Miller falls, which, aided by excavations made in the bed of the river, through Crocker's and Potter's rifts, has produced a good boat navigation between Fort Edward and Fort Miller. The excavation of a lateral canal around Fort Miller falls, and the construction of two locks at that place, are in a state of considerable forwardness. The greater part of the materials for a dam across the Hudson, to be located near the head of Saratoga falls, are prepared. The object of this dam is to raise the water into the canal on the Saratoga level, and to complete the navigation above the dam, to its junction with the lateral canal before mentioned. The fencing of the canal, and the completion of the towing path along Wood creek, between Fort Edward and Whitehall, have been nearly finished; and that part of the route in which the navigation is confined to Wood creek, has been very much improved by cutting off several sinuosities in this stream.

The unparalleled drought of last season, occasioned, for three months, a deficiency of water on the summit level. Although it could not be predicted that such a season would occur, yet its result, if it did happen, was always foreseen. Indeed, from the examinations of 1816, it was not believed that the summit level could be navigated at all without a supply of water from a feeder. It was

supposed at that time, that a feeder might be brought from Lake George, or from the Hudson river; and it was ascertained, that one might be easily made from Halfway brook: And in the Report of the Canal Commissioners of the 18th March, 1817, it is proposed "to erect a dam across Halfway brook, of eighteen feet in height, half a mile above the mouth of said brook, and by a natural ravine leading to the south, to direct so much of the water of said brook to the summit level, as may be necessary for the convenience of the canal."

Further examinations were made in 1817, and in the Report of the 31st January, 1818, the Canal Commissioners state, that "considerable time was spent in exploring, with a view to ascertain whether, in case the trade on the canal should, in a course of years, increase to such a degree as to exhaust Halfway brook, which is the principal source of supply for the summit level, a sufficient quantity of water might be obtained from any other quarter. Levels were carried from the Hudson river, at several points above Fort Edward, to the line of the canal. And it was ascertained, that in the event of future deficiency, water may be drawn from the Hudson by a short feeder, in any quantity which may be necessary." Thus it will be perceived that Halfway brook was regarded as "the principal source of supply for the summit level," that a feeder from this stream was deemed indispensable, and that the necessity of an additional future supply from the Hudson was also anticipated.

The summit level was finished in 1819, and it was found, during the excavation of the same, that several copious springs were intercepted, and that without any feeder, the supply of water was greater than had previously been expected. By a reference to the Report of the 18th February, 1820, it will be seen that it was expected, "that with ordinary seasons," a feeder for the present would not be wanted. The limited appropriations to the Champlain canal did not warrant the construction of a feeder in 1819. Had the feeder been made, the summit level could not have been finished; and it appears in the same Report, that "owing to a deficiency of funds, the canal was not fenced."

For ten years previous to the last season, the summers in general were cool and wet; and during the whole of that period, (except the season of 1816) had the canal been previously constructed, it is believed there would have been a sufficient supply of water on the summit level, without any aid from the Hudson, or Halfway brook. But last summer was an exception to almost every other. From the middle of June to the 20th September, the ordinary summer showers were almost entirely wanting; and during this period, the heat of the atmosphere occasioned an evaporation so intense as to exhaust the streams and springs in the neighborhood of the Champlain canal, to a degree never before witnessed by the oldest inhabitants of the country.

The foregoing references to former Reports, and the preceding observations, are submitted to shew, that the failure of water on the summit level was

not occasioned by any mistake of the Commissioners or Engineer, or by leaks in the canal, as some have erroneously supposed.

The extraordinary dryness of the last summer produced a considerable diminution of the water of Halfway brook, although that stream is entirely formed by springs : And as such seasons may occur again, it was thought best to make a feeder from the Hudson in the first instance, whereby the expense of a feeder from Halfway brook, which might not at all times be sufficient, would be entirely saved to the state.

Two modes of constructing this feeder, presented themselves. The one, by taking the water from the head of Baker's falls, and leading it along the declivity, parallel to the river, to a point where the bank, composed of slate rock, became too precipitous to proceed further, and from thence by a small tunnel or sough, nearly at right angles with the river, to conduct the water through a ridge of slate, into a ravine, from whence it might easily be connected with the summit level. The other, by throwing a dam across the Hudson, about half a mile above the village of Fort-Edward, thereby raising the water to the necessary height, and by a navigable cut of about half a mile in length, to connect the pond created by said dam, with the summit level. This feeder is indicated on the engraved map and profile of the Champlain canal.

It was at first thought, that the former mode might be preferable to the latter : But, after spending some time in sinking shafts for the sough, the

hardness of the rock, and the great influx of water through the seams of slate, produced a different conclusion. A contract was therefore made, for the erection of the dam, the excavation of a navigable feeder, and the construction of a guard-lock, to prevent the irruption into the canal, of the floods of the river. The excavation was nearly finished last season, and the materials for the dam are to be transported to the spot, early in the spring. With a favourable season, it is expected that these works will be finished within six or seven months from this time. It is believed, that the Champlain canal will be completed and rendered navigable next season, as far as to the south end of the Saratoga level, and that the remaining ten miles, to the village of Waterford, will be excavated. The whole of the Champlain canal might be finished this year, with the aid of the liberal appropriations recently made by the Legislature. But as there is ninety-three feet of lockage in the above mentioned ten miles, and as the stone for the locks, must be brought from the town of Kingsbury, it will be more economical to delay the construction of the locks, until another year, when the canal will be in operation, as above mentioned, and thereby save the expense of about thirty miles of land carriage, of these ponderous materials.

Although the navigation was interrupted for three months, by a deficiency of water on the summit level, yet, during the spring and fall, considerable quantities of lumber were transported through the canal, from Lake Champlain to the Hudson, and

from thence to a southern market; upon which, however, as the works were not finished, no toll was received.

The whole quantity of lumber, which passed from Lake Champlain, through the locks at Whitehall, according to the return of the lock-keeper, is as follows, to wit: One hundred and fifty-nine thousand boards, ninety-eight thousand plank, thirteen thousand cubic feet of pine timber, ten thousand do. of hemlock timber, twenty-nine cords of tanners' bark, twenty-four do. of fire wood, one hundred and four thousand oak staves, forty-nine thousand shingles, three thousand four hundred and eighty saw-logs, ten thousand rails, nine thousand cedar posts, and eight thousand fence boards.

In looking back to the numerous difficulties, and responsibilities,—some of them of an aspect the most disheartening, which surrounded the canals, especially in their commencement, we feel compelled, by common justice, to commend the aid, which has been, at all times, afforded by our Engineers. In the selection of all the persons, who are now employed by us, under this character, we have been eminently fortunate. But to the Hon. Benjamin Wright and James Geddes, the state is most indebted. Possessing much local information, competent science, long experience in many kinds of business bearing some analogy to canal operations, and well established characters for industry and fidelity, these gentlemen have rendered the most essential services, in all the duties of their department. They were first appointed Engineers: They have

unceasingly, and with improving fitness, devoted their best faculties to the great cause in which they were engaged. And they have hitherto been found equal to the high trusts confided to them.

The state has now been engaged, nearly four years, in the actual construction of the Erie and Champlain canals. And the success of her efforts has been, at least, equal to the expectation of the most ardent advocates of these measures. This success could not have been attained, without care, vigilance, discretion, and energy, in the complicated and arduous labours, of which it is the fruit. And these labours could not have been performed, without the support of a wise foresight, and just liberality, in several successive legislatures. To us, it appears, that these legislatures have afforded a spectacle most animating, encouraging, and delightful, in reference to the sagacity of the people to understand, and their wisdom to provide for, their most substantial interests. They exhibit the most impressive example, which the United States have yet produced, since the adoption of the Federal constitution, of the beneficent effects of free government, upon the character of a community. They are intimately connected with the best hopes of the Republic. Rising above all fugitive and partial interests, and with a full detail of the costs of these works before them, the immediate representatives of the people, have so clearly discerned the benefits, which they would introduce, as to apply to them from year to year, a greater proportion of their funds, than is sufficient, to defray the ordi-

nary expenses of their state government. And this proportion, your honorable body has greatly encreased.

When a project is once decisively embraced, of which the practicability is ascertained, but of which only a small part of its advantages can be enjoyed before it is fully performed, it is wise, it is economical, to apply large means to the performance. And the appropriation of the additional million of dollars to the canals, for this year and the next, will be every where a theme of praise and congratulation. This act of the legislature, is a just and a great cause for rejoicing,—because it ensures the speediest possible completion of the canals,—because, when they are completed, they will immediately communicate their blessings to millions of freemen,—and, because they will contribute most effectually and rapidly to the spreading of our fellow-citizens broad-cast and thick, with all their precious institutions for the perpetuation of civil liberty, and the promotion of knowledge and virtue—with every thing most admirable and sacred, in our social condition, throughout the almost boundless and unoccupied regions of the west.

DE WITT CLINTON,
STEPHEN VAN RENSSELAER,
SAMUEL YOUNG,
MYRON HOLLEY,
HENRY SEYMOUR.

Dated 12th March, 1821.

AN ACT

Concerning the Erie and Champlain Canals.

Passed February 9, 1821.

WHEREAS in the prosecution of the great western and northern canals, experience has not only demonstrated the practicability of their construction, but so far as any portions of them have been completed, their unquestionable utility: And whereas it is of great importance to the interests of this state, that the whole should be finished and made productive without any unnecessary delay, and at a period when all circumstances are highly favorable to their progress: Therefore, in consideration of the great advantages which offer at the present time in the cheapness and abundance of labor, and in the low rate at which money may be obtained for the accomplishment of these interesting and useful works,

Be it enacted by the People of the State of New-York, represented in Senate and Assembly, That the commissioners of the canal fund be, and they are hereby empowered, in addition to the loans already authorized by law, to borrow from time to time, during the years one thousand eight hundred and twenty-one, and one thousand eight hundred and twenty-two, moneys on the credit of the state, at a rate not exceeding six per cent. per annum, and not exceed-

ing one million of dollars in each year; for which moneys, so to be borrowed, certificates of stock shall be issued in the manner directed in and by the act, entitled "an act to improve the funds and to provide for the redemption of the funded debt of this state," payable at such time or times as may be determined by the said board, out of the canal fund; and to pay to the canal commissioners the moneys so to be borrowed, to be applied in the same manner and proportion as already provided for by law: *Provided*, That it shall not be lawful for the commissioners of the canal fund, to make loans under this act beyond such amount as, for the payment of the interest thereof, the canal fund at the time shall be deemed ample and sufficient.

And be it further enacted, That it shall be lawful for the two houses of the legislature, by concurrent resolution, to appoint an additional canal commissioner; and that the commissioner so appointed, as well as the present commissioners, shall hold their respective offices during the pleasure of the two houses of the legislature, subject to be removed by concurrent resolution of the two houses.

And be it further enacted, That it shall be lawful for the two houses of the legislature, by concurrent resolution, to appoint three appraisers on the eastern section of the Erie canal, and three appraisers on the western section of the Erie canal, and three appraisers on the Champlain canal; and that the appraisers so appointed, as well as the present appraisers, shall hold their respective offices during

the pleasure of the legislature, subject to be removed by concurrent resolution of the two houses.

And be it further enacted, That it shall be the duty of each and every canal commissioner already appointed, to superintend the making and constructing of either the Erie or Champlain canals, within sixty days from the passage of this act, and of every acting canal commissioner hereafter appointed, before entering upon the duties of his office, to enter into a bond to the people of this state, with at least two substantial freeholders as sureties, in a penal sum of fifty thousand dollars, conditioned for the faithful discharge of the duties now enjoined, or that may hereafter be enjoined on him by law; and for the faithful accounting of all moneys entrusted to him, as such acting canal commissioner, whenever, and as often as he may be required so to do by law, or by concurrent resolution of the senate and assembly, or by the comptroller of this state; and the said bonds shall be approved of by the comptroller, and filed in his office.

And be it further enacted, That in order the better to guard against mistakes and losses, it shall be the duty of the acting canal commissioners, respectively, hereafter to take duplicate receipts for all sums of money which they may advance and pay to their engineers, contractors and agents.

And be it further enacted, That whenever the sum or sums of money, paid to any canal commissioner, and remaining unaccounted for, shall amount to fifty thousand dollars, it shall not be lawful for the commissioners of the canal fund, to advance or

pay to such canal commissioner any further sum or sums of money, until he shall first have produced an account and vouchers to the comptroller, shewing the payment and expenditure on the canal of at least forty thousand dollars of said sum.

And be it further enacted, That it shall be the duty of the commissioners of the canal fund, previous to every loan hereafter to be made, to give notice of such intended loan, that sealed proposals will be received to a given day ; which proposals shall not be opened until a certain hour of such day, to be named in the notice ; and said notice shall be published in two newspapers, in each of the cities of New-York and Albany, and continued for two weeks daily in the New-York papers, and at least twice a week in the Albany papers.

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Box 90